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### Modern Tools for Sustainable Development of Territories. Special Topic: Project Management in the Regions of Russia

#### ENERGY SERVICE CONTRACTS IN RUSSIA AND THE EUROPEAN UNION

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#### *Abstract*

According to research and statistics, expenditures on payment for the use of resources in Russia reached 80% of all payments for the maintenance of buildings and industries. Depreciation of fixed assets, especially in the public sector, reaches 60%. The cost of modernization is high, and based on the real economic situation of many enterprises it is almost impossible. In this aspect, an option is needed that will solve the problem of modernization without attracting working capital to business entities. The energy service contract is today one of the most effective tools for modernizing energy consumption systems. Today in Russia there are no standard agreements for energy service events. Each energy service company creates its own unique option. The lack of a unified technology for determining the payback of measures and calculating a baseline aimed at saving energy creates difficulties in the work of energy service companies. On the other hand, the development of energy efficiency and energy saving in Russia does not occur due to the lack of a clear concept for consumers about the amount of savings, material resources during operation of the implemented energy technologies, which are initially quite expensive. The authors of the article made a comprehensive analytical review of the implementation mechanism, problems and prospects for the application of energy service contracts (agreements) in Russia and the countries of the European Union. Based on the results of the comparison, promising areas for the development of energy services in Russia and the European Union were identified.

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**Keywords:** Economy, efficiency, energy consumption, energy saving, energy service contract, market.



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## **1. Introduction**

The energy consumption system, which is currently undergoing fundamental changes, is the subject of one of the most effective tools of the energy services market, offered in the form of an energy service contract. Currently, in Russia there is no standard (model) for the formalization of this type of contract. Each of the enterprises (companies) independently develops its own versions of such contracts, which prescribe certain conditions for the return of funds for energy saving measures that result in the indicated savings.

The definition of “energy service contract” is laid down in FZ-261 of 11.23.09. “On energy saving, improving energy efficiency, and amendments to certain legislative acts of the Russian Federation”. An energy service contract is understood to mean a contract that provides for the implementation of executive actions leading to energy saving and increased energy efficiency. Those who directly need the introduction of energy-saving technologies order certain services from energy service companies. The customer allows the energy service company to inspect the facility, while the whole range of work is carried out at the expense of the performer (Zubkov, 2015).

## **2. Problem Statement**

The issues of the use of energy service contracts in the world practice was dealt with by such Russian scientists as Zubkov (2015), Gorshkov (2015), Spitsina (2015), among foreign scientists this issue was considered by Polzin, von Flotow and Nolden, (2016a, 2016b), Cagno and Trianni (2014). To date, there is no review of the use of energy service contracts in Russia and the EU, although there is a rather significant amount of information available. The description of the mechanism for applying the energy service contract both in Russia and in the EU countries is a statement of the problem to identify both positive and negative aspects in the provision of energy services and the prospects for their development.

## **3. Research Questions**

The main research questions formulated in the paper and acting as research tasks are the following

- 3.1. Conducting a comprehensive analytical review of the use of energy service contracts in Russia and the EU.**
- 3.2. Comparative analysis of the practice of applying contracts in Russia and the EU.**
- 3.3. Identification of promising areas for the development of energy services in Russia.**

## **4. Purpose of the Study**

The aim of the study is to conduct a comprehensive analytical review of the application of energy service contracts in Russia and the EU, which will describe the mechanism for the step-by-step implementation of energy service contracts and determine the main advantages and disadvantages of their implementation.

## 5. Research Methods

The study is based on traditional methods of information processing: monographic, logical, comparisons and others.

## 6. Findings

Today in Russia there are two ways to conclude an energy service contract. The basis of the first method is the principle of financing an energy saving measure at the expense of the energy service company. This contract identifies specific activities through which savings are made. At the same time, according to the contract, part of the savings for a certain period can remain with the customer, and the rest is transferred to the energy service company. The money that the energy service company receives as a result of the measures taken allows it to recoup the costs incurred by it as a result of energy efficiency measures, and also makes up a certain part of the profit of the energy service company. An important aspect is that the customer does not pay more for energy resources than he paid before the conclusion of the energy service contract. If the savings do not reach the required volumes stipulated in the contract, the energy service company will find out the reasons for the situation and eliminate them.

The second method is fundamentally different from the first. It is based on installments for the implementation of contractual work defined by the contract. The customer concludes an energy service contract with the company for a specified period. According to the contract, the energy service company will perform specific work. It will receive money for the amount of work done, regardless of whether energy is being saved or not. From an economic point of view, these contracts are very interesting for energy service companies. And in the practice of energy services in Russia at the beginning of the formation of energy services, these contracts were concluded. From the studies conducted by the authors, it follows that the energy service contracts that were concluded in Russia under this scheme did not lead to the necessary savings. At the same time, from a legislative point of view, the energy service company was in a favorable position, as it was fulfilling the terms of the contract for the replacement of equipment. That is why, this type of energy service contract is not of interest to customers in Russia, as it does not guarantee savings. Today, energy service contracts are practiced where the customer pays from real savings (Polyanskaya & Bespalova, 2016).

The study of the mechanisms of energy service contracts is carried out by both Russian and foreign scientists, but today there is no review of application information on energy service measures in both Russia and the EU countries, despite the rather large amount of information.

Let us consider the mechanism for the phased implementation of the energy service contract in Russia (Table 01).

**Table 01.** Phased implementation of the energy service contract in Russia

<b>Description</b>	<b>Task</b>	<b>Result</b>	<b>Who performs</b>
Real position analysis	Increase energy efficiency	Energy Efficiency Event	Customer
Customer site survey	Assess condition of customer's facility	Real data on customer's facility	Energy service company

Selection of technical solutions	Select the necessary equipment and materials	Selection of suppliers of specific equipment	Energy service company
Estimation of potential savings	Calculate the payback of the project	Project payback plan	Energy service company
Financing	Determine the source of financing	Building a financing scheme	Energy service company
Standard or individual contract	Prepare a contract	Contract	Energy service company, customer
Contract project work	Develop and coordinate the project in regulatory authorities	Project with finished documentation	Energy service company, customer
Installation of equipment	Mount equipment	Energy efficient equipment ready for use	Energy service company
Commissioning operation	Prepare and sign the commissioning Act	Commissioning Act	Energy service company

Designed by authors

From the above, we can identify the following positive aspects of the application of such a contract in Russia.

When concluding an energy service contract, an additional financial burden does not fall on the customer.

After the end of the energy service contract, the equipment becomes the property of the customer and the resulting savings in the future remain with the customer.

An energy survey is conducted as a result of which energy efficiency measures are proposed and agreed with the customer.

The financial side of the energy service contract issue is only the savings that occur on energy resources.

The energy service company fully finances the contract from its own or borrowed sources. The risks of non-performance of the contract and credit risks are also borne by the legal entity involved in the energy service.

The energy service company is responsible for the quality of the equipment provided according to the contract term.

Responsibility for the operation of the equipment during the contract term is assigned to the energy service company.

The transfer of ownership of the equipment occurs at an agreed redemption price after the expiration of the contract (Gorshkov, 2015).

In the territory of the Russian Federation, four main participants in energy services can be distinguished:

- public authorities and local governments, which in turn regulate the market for energy services and the activities of energy service companies. In order to determine the highest price of the contract, it is necessary to determine the actual costs of the customer for the supply of energy

resources for the past year and compare these costs, taking into account the features established by the Government of the Russian Federation;

- the customer of energy services that determine the demand for energy services;
- energy service companies - performers of energy services;
- associations and self-regulatory organizations: associations of performers;
- energy services (Spitsina, 2015).

Today the energy service market in Russia is growing. This is evidenced by statistics. For example, if the market volume in 2011 was 74 million rubles, then in 2017 it grew more than 200 times and amounted to 15 581 million rubles. The number of contracts is also growing. According to statistics, from 2011 to 2017, the number of contracts increased by almost 11 times (Table 02 and Table 03) (Energy and industry of Russia, 2019). This indicates that the regions and mainly budgetary enterprises began to conclude energy service contracts, since one of the main tasks is to save budget funds, as well as to modernize worn out fixed assets.

**Table 02.** Statistics of the market of energy services in 2011-2017

Indicator	2011	2012	2013	2014	2015	2016	2017
Market volume, mln. rub.	74	481	382	1225	1382	5020	15 581
Expected savings, mln. rub.	155	504	519	1359	1 528	5591	17 424
Number of contracts (units)	46	98	69	143	341	671	488

**Table 03.** The main characteristics of the market of energy services for 2017

Indicator	1 <sup>st</sup> quarter	2 <sup>nd</sup> quarter	3 <sup>rd</sup> quarter	4 <sup>th</sup> quarter	total
The total value of energy service contracts	6 109	792	8 081	2 452	17 435
Market volume, mln. rub.	5 350	693	7 391	2 147	15 581
Number of contracts (units)	64	56	194	174	488

The main three leaders in Russia, where the maximum number of energy service contracts are concluded, is headed by the Republic of Sakha (Yakutia) - 42 contracts for a total of 858 million rubles, Smolensk region - 101 contracts for a total of 378 million rubles, and Sverdlovsk region – 25 contracts for a total of 301 million rubles (Table 04) (Energy and industry of Russia, 2019).

**Table 04.** Regions - leaders in energy service contracts

The subject of the Russian Federation	Number of contracts, units	The price of contracts, million rubles	Share, %
The Republic of Sakha (Yakutia)	42	858	19.00
Smolensk region	101	378	8.40
Sverdlovsk region	25	301	6.60
Republic of Tatarstan	8	216	4.80
Murmansk region	6	180	4.00

Today in Russia, the main problem for energy service companies is the financing of energy service projects. Unfortunately, the banking sector does not practically consider this type of service, and

therefore, loans are practically not issued. Factoring agreements are also concluded with reluctance, since the main customers of energy services are budget organizations that may delay payments under energy services agreements due to unstable budget revenues.

In the countries of the European Union, they have been engaged in energy conservation for more than 45 years, and in 2012 Directive 2012/27 / EU was introduced, which describes measures to improve energy efficiency in order to reduce energy saving by 20% by 2020. This document coordinates actions within the EU, creates a favorable climate and comfortable conditions for the development of the energy service market, and implements energy-efficient programs. However, not all European Union countries comply with the Directive. Many countries are not interested in its implementation. In many EU countries, energy efficiency is currently one of the main strategies, therefore energy service activities play a very important role (Polzin et al., 2016a).

About 30 different energy efficient technologies are used in the EU. But the most demanded and fast-growing segment of energy saving is lighting. According to statistics, 25% of projects are related to energy service events, which are based on the replacement of lighting equipment (Bratt, Hallstedt, Robert, Broman, & Oldmark, 2013). We would like to draw special attention to the fact that this segment of energy conservation is also developing in Russia.

The development of energy services in the European Union is one of the factors for increasing energy efficiency. Unlike Russia, the approach to the problem arising in the field of energy efficiency is different and depends on various indicators (legal, political, financial) (Polzin, von Flotow, & Nolden, 2016b).

Table 05 below shows one of the mechanisms for implementing energy service contact in the EU countries (Kiryudcheva & Nemova, 2017).

**Table 05.** Phased implementation of the energy service contract in EU

<b>Description</b>	<b>Task</b>	<b>Result</b>	<b>Who performs</b>
Energy efficiency increase solution	Decision to increase energy efficiency	Conclusion on signing an energy service contract	Customer
Customer site survey	Assessment of possible energy saving facility	Creation of a complex of energy-saving measures with the calculation of the economic effect and payback period	Energy serving company
Investors attracting	Construction of a financial mechanism scheme	Start of financing	Energy serving company
Project works	Development and regulation of the project in regulatory authorities	Project with finished documentation	Energy serving company
Installation and commissioning of equipment	Search for a supplier of equipment and work	Energy efficient equipment ready for use	Energy serving company
Final stage	Creation of instructions and consulting services to technical personnel of the customer.	Commissioning of energy-efficient equipment	Energy serving company

Compared to Russia, the energy service in the EU countries is distinguished by the fact that between the owners of the facility and the energy service company, the savings are divided regardless of the amount of savings over a period of time. The term for the implementation of contracts is approximately the same, as in Russia, and ranges from 3 to 10 years. The project is not paid by the owner, but he receives a percentage of the savings during the contract period and all the savings upon completion.

EU countries have developed financing through loans from commercial banks or through state and municipal bond borrowing. Expenses which are not related to energy saving are usually covered by building owners or budget subsidies (Cagno & Trianni, 2014).

We would like to draw attention to the fact that in some EU countries (for example, in Germany) there is a stimulation of the introduction of energy service contracts. It manifests itself in the form of harsh legislative requirements of the state, support at the state level, assistance in acquiring the necessary equipment for energy conservation measures, interest of financial institutions to invest in energy services.

However, despite the many advantages of using energy service contracts in EU countries, there are also a number of problems. The use of energy service contracts leads to job cuts in budget institutions. In the industrial sector, a desire to conclude contracts very often arises, however, customers often doubt the correctness of the calculation of basic indicators, which in turn leads to distrust in working with energy service companies. Among the main problems in the EU's activities, technical and economic risks are highlighted, as well as a low level of awareness for project development (Principi, Roberto, Carbonari, & Lemma, 2016).

## **7. Conclusion**

In Russia, energy resources are used inefficiently. The introduction of energy-saving technologies is almost not carried out in practice due to the lack of a targeted state policy and the interest of banks in issuing loans to energy service companies. However, it is necessary to note a positive trend in the energy service market over the past 3 years. According to statistics, the number of energy service contracts concluded in Russia is growing rapidly.

Energy service activities in the European Union are steadily developing. Thanks to the support from the authorities, the energy service in the EU is actively developing and becoming more and more in demand, however, there are some problems. The experience of implementing energy service contracts in the EU will make it possible to realize the potential for energy conservation in Russia. Thanks to the use of energy service contracts, a key condition is fulfilled - the development of energy services - assuming the risks of achieving results to improve energy efficiency. Having solved a number of problems related mainly to the issues of financing energy service companies in Russia, the successful application of energy service contracts will become possible and demanded.

## References

- Bratt, C., Hallstedt, S., Robèrt, K.-H., Broman, G., & Oldmark, J. (2013). Assessment of criteria development for public procurement from a strategic sustainability perspective. *Journal of Cleaner Production*, 52, 309-316.
- Cagno, E., & Trianni, A. (2014). Evaluating the barriers to specific industrial energy efficiency measures: an exploratory study in small and medium-sized enterprises. *Journal of Cleaner Production*, 82, 70-83.
- Energy and industry of Russia. (2019). Retrieved March 12, 2019, from eprussia.ru. [in Russ.].
- Gorshkov, A. S. (2015). What inhibits the implementation of energy saving in Russia? *Energy Saving*, 6, 46-49. [In Russ.].
- Kiryudcheva, A. E., & Nemova, D. V. (2017). Energy service contracts in Russia and the European Union. *Construction of unique buildings and structures*, 10(61), 7-21. [In Russ.].
- Polyanskaya, O. A., & Bespalova, V. V. (2016). Energy service contract as a way of saving working capital in the public sector. *Taxes and Finances*, 3(31), 45-48. [In Russ.].
- Polzin, F., von Flotow, P., & Nolden, C. (2016a). Modes of governance for municipal energy efficiency services – The case of LED street lighting in Germany. *Journal of Cleaner Production*, 139, 133-145.
- Polzin, F., von Flotow, P., & Nolden, C. (2016b). What encourages local authorities to engage with energy performance contracting for retrofitting? Evidence from German municipalities. *Energy Policy*, 94, 317- 330.
- Principi, P., Roberto, F., Carbonari, A., & Lemma, M. (2016). Evaluation of energy conservation opportunities through Energy Performance Contracting: A case study in Italy. *Energy and Buildings*, 128, 886-899.
- Spitsina, L. Y. (2015). Energy service contract for state and municipal needs as an institution of energy conservation in Russia. *Modern problems of science and education*, 1, 640-646. [in Russ.].
- Zubkov, S. V. (2015). Energy service contract as a mechanism to increase energy efficiency. *Economics and management of innovative technologies*, 12(51), 90-92. [in Russ.].